REMARKS

Claims 1-6, 8-12, 14, 16, 18-22, and 24-35 are pending in this application. Claim 14-16 and 18 have been amended to correct informal errors. Claim 15 has been canceled and Claims 1, 6, and 24 have been amended herein. Support for the amendments to Claims 1 and 24 can be found in the specification as originally filed, for example, in Fig. 1. Support for the amendment to Claim 6 can be found in the specification as originally filed, for example, at page 9, lines 9-14. New Claims 34-35 have been added. Support for the amendment to new Claims 34-36 can be found in the specification as originally filed, for example, at page 3, lines 29-31. In view of the above claim amendments and the following remarks, Claims 1-6, 8-12, 14, 16, 18-22, and 24-35 are in condition for allowance.

Independent Claim 1

Independent Claim 1 was previously rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,475,446 to Horiike (Horiike) in view of U.S. Patent No. 5,183,401 to Dalla Betta et al. (Dallas Betta), U.S. Patent No. 6,365,283 to Brück (Brück), and U.S. Patent No. 6,040,266 to Fay III et al. (Fay). Claim 1 has been amended herein to clarify that "the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage." In this way, the narrowed flow area of the transition region prevents flashback into the transition stage and protects the first catalytic stage from the heat generated by the second catalytic stage of the catalytic combustor, yet enough exposure can be provided with the second catalytic stage to substantially oxidize the partially oxidized fuel/oxidizer mixture from the first catalytic stage in the second catalytic stage. None of the cited prior art references, alone or in combination, teach or suggest "a transition stage [comprising a narrowed flow area region] disposed between a first catalytic stage and a second catalytic stage...wherein the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage."

The Examiner admits that Horiike fails to teach a "narrowed flow area transition region" at page 6 of the October 2, 2007 Office Action. Similarly, Dalla

Betta, which merely discloses a two stage catalytic combustor, and Fay, which discloses a foam catalyst support, are wholly silent as to a narrowed flow area transition region. The Examiner, however, points to Figs. 1 and 5 of Brück and states that Brück teaches that as fluid flows through the catalyst support, the channels increase causing a narrowing of flow. *See* page 7 of the October 2, 2007 Office Action.

Accordingly, Brück does not teach or suggest "a transition stage [comprising a narrowed flow area region] disposed between a first catalytic stage and a second catalytic stage... the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage" as required by amended Claim 1. *Assuming arguendo* for the purpose of this argument only that region A of Brück defines a first catalytic stage, region B defines a transition stage, and region C defines a second catalytic stage, as shown in Figs. 1-5 of Brück, transition stage B of Brück is not "disposed between a first catalytic stage and a second catalytic stage...wherein the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage." Instead, regions A, B, and C of Brück increasingly define sections with an increasing number of channels to provide successively narrower flow regions. Accordingly, neither Horlike, Dalla Betta, Brück, or Fay, individually or collectively, teach or suggest the limitations of Claim 1 as amended.

Moreover, Applicants submit that it would not have been obvious to provide "a transition stage [comprising a narrowed flow area region] disposed between a first catalytic stage and a second catalytic stage...wherein each of the first catalytic stage and the second catalytic stage has a cross-sectional area greater than a cross-sectional area of the narrowed flow area region of the transition stage. At most, as mentioned, Brück teaches a honeycomb body having a plurality of successive sections of the same cross-sectional area that have a increasingly number of channels to successively narrow the flow to increase the heat capacity in selected areas of the honeycomb body. See Fig. 1 of Brück. Accordingly, in view of the cited references, an artisan having common sense at the time of the

invention would not have had considered providing a transition stage having a narrowed flow area region between a first and second catalytic stage, wherein the narrowed flow area region of the transition stage has a narrower flow area than each of the first catalytic stage and the second catalytic stage when the prior art discloses providing successively narrower flow regions. As stated above, in the claimed invention, the narrowed flow area of the transition region prevents flashback into the transition stage and protects the first catalytic stage from the heat generated by the second catalytic stage of the catalytic combustor, yet enough exposure can be provided with the second catalytic stage to substantially oxidize the partially oxidized fuel/oxidizer mixture from the first catalytic stage in the second catalytic stage.

Applicants note that while the term "Venturi effect" has a known definition as set forth in Butler et al. "Fire Behavior Associated with the 1994 South Canyon Fire Storm King Mountain, Colorado" (September 1998) (Butler) (defining a Venturi effect as "the increase in velocity of a stream of gas or liquid as it passes from one area through another area of smaller size or diameter..."), this definition alone also fails to teach or suggest that it would be desirable to employ a narrowed flow area region effective to generate such a Venturi effect between successive catalytic stages, which receive a fuel/oxidizer mixture and a partially oxidized fuel/oxidizer mixture respectively, wherein the narrowed flow area region of the transition stage has a narrower flow area than each of the catalytic stages. Consequently, Claim 1 is in condition for allowance.

Dependent claims 2-5, 32, and 34 are dependent on Claim 1, and therefore include the limitations of Claim 1. Accordingly, dependent claims 2-5, 32, and 34 are also in condition for allowance.

Independent Claim 6

Claims 6, 9, and 20-21 were previously rejected under 35 U.S.C. 103(a) as being unpatentable over Horiike in view of Dalla Betta et al. (Dalla Betta) and U.S. Patent No. 6,365,283 to Brück (Brück). Claim 6 has been amended to recite that "each of the plurality of separate catalytic elements...[comprises]... an identical

cross-section and being axially rotated about the flow axis with respect to an adjacent catalytic element effective to cause mixing of a flow about the flow axis."

None of the cited prior art, alone or in combination, teaches or suggests a plurality of separate catalytic elements "... being axially rotated about the flow axis with respect to an adjacent catalytic element" as required in Claim 6. Horrike and Dalla Betta are wholly silent as to the aforementioned claim limitation. Further, Brück teaches a honeycomb body having sections which increasingly narrow the flow in the flow direction of the honeycomb body. To do so, Brück varies the number of channels in a flow direction of the honeycomb body. As is explained at col. 5, lines 13-42 and shown in Figs. 1 and 5, the number of channels per cross-sectional area differs in each of the three sections A, B, and C of the honeycomb body. Section A includes structured metal layers 11 separated by smooth sheet metal layers 4. Section B includes additional structured sheet metal layers 13 separated by smooth sheet metal layers 5. Section C includes further sheet metal layers 14 and additional smooth sheet metal layers 6 positioned between sheet metal layers 11, 14. Nowhere in Brück is it disclosed that any one its catalytic elements or sections are axially rotated about the flow axis with respect to an adjacent catalytic element. For example, there is no disclosure in Brück that a first catalytic section may itself be axially rotated to a point, for example, 75 degrees relative to the flow axis and relative to a second catalytic element, for example. In view of the above, Claim 6 as amended is now in condition for allowance.

Dependent claims 8-12, 14, 16, 18-22, and 34 are dependent on Claim 6, and therefore include the limitations of Claim 6. Accordingly, dependent claims 8-12, 14, 16, 18-22 and 34 are also in condition for allowance.

Independent Claim 24

Similarly, Independent Claims 24 was previously rejected under 35 U.S.C. 103(a) as being unpatentable over Horlike in view of U.S. Patent No. 5,228,847 to Lywood (Lywood), Brück, and Fay. Independent Claim 24 has been amended herein to require that the "transition pressure boundary (between the upstream and downstream pressure boundary and having a narrowed flow area region) is

configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the upstream pressure boundary."

None of the cited references, individually or collectively, teach the limitations of Claim 24 as amended. The Examiner admits that Horiike does not teach a narrowed flow area region at page 18 of the October 2, 2007 Office Action. In addition, Lywood, which discloses first and second preliminary catalyst bodies and a main catalyst body, and Fay which discloses a foam catalyst support, are wholly silent as to a narrowed flow area region. At most, Brück teaches a honeycomb body having a plurality of successive sections that increasingly narrow the flow to increase the heat capacity in selected areas of the honeycomb body. *See* Fig. 1 of Brück. According to Brück, "[f]or many applications it is advisable for a honeycomb body to have a greater heat capacity internally than at its inlet end." *See* col. 3, lines 56-58 of Brück. There is no teaching or suggestion in Brück, however, of a transition stage that is configured to substantially limit combustion of a partially oxidized fuel/oxidizer mixture from an upstream pressure boundary or any suggestion of why it would be desirable to do so. Accordingly, neither Horiike, Lywood, Brück, nor Fay, individually or collectively teach or suggest the claimed invention.

Dependent claims 25-33 are dependent on Claim 24, and therefore include the limitations of Claim 1. Accordingly, dependent claims 25-33 are also in condition for allowance.

New Claims

New Claims 34-35 have been added, each of which requires that the transition stage (between the first catalytic stage and the second catalytic stage) is configured to substantially limit combustion of the partially oxidized fuel/oxidizer mixture from the first catalytic stage. Applicants submit new Claims 34-35 provide further reasons for allowance for the reasons set forth above with respect to Claim 24.

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Reconsideration of the amended application in light of the above Remarks and allowance of claims 1-6, 8-12, 14-16, 18-22 and 24-35 are respectfully requested.

Respectfully submitted,

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